

DETAILED ACTION

1. This Office Action is in response to the amendment filed 11/19/09. Claims 1, 20, 28, 30 and 31 were amended. Claims 37-41 were added.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 8, 9, 10 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Arnott (U.S. Patent 3,581,137).

Regarding claim 1, Arnott discloses a source of light for emitting light (13); a down conversion material receiving the emitted light and converting the emitted light into transmitted light and backward transmitted light (abstract); and an optic device, having at least one transparent side wall (Fig. 1), configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device through the at least one transparent side wall (6, Fig. 1).

Concerning claim 8, Arnott discloses the source of light is disposed adjacent a first end of the optic device (13, Fig. 1).

Regarding claim 9, Arnott discloses the down conversion material being disposed adjacent a second end of the optic device, the second end opposed to the first end (Fig. 1). (Nothing in the claim says that it cannot be on the first end as well; the down conversion material completely covers the inside of the tube.)

Concerning claim 10, Arnott discloses the optic device is geometrically configured to transmit the backward transmitted light out of the optic device (Fig. 1).

Regarding claim 28, Arnott discloses a source of light for emitting light (13); a down conversion material receiving the emitted light and converting the emitted light into transmitted light and backward transmitted light (abstract); and an optic device, having at least one transparent side wall (6), configured to receive the backward transmitted light and transfer substantially all of the backward transmitted light outside of the optic device through the at least one transparent side wall (6, Fig. 1).

4. Claims 1-7, 10-13, 28-30 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwasa et al. (U.S. Publication 2002/0047516 A1).

Regarding claim 1, Iwasa et al. discloses a source of light for emitting light (abstract); a down conversion material receiving the emitted light and converting the emitted light into transmitted light and backward transmitted light (20); and an optic device, having at least one transparent side wall (18), configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device through the at least one transparent side wall (Figs. 1 and 3a).

Concerning claim 2, Iwasa et al. discloses the source of light as a semiconductor light emitting diode, including one of a light emitting diode (LED), a laser diode (LD), or a resonant cavity light emitting diode (RCLED). See the abstract.

Regarding claim 3, Iwasa et al. discloses the down conversion material including one of phosphor or other material for absorbing light in one spectral region and emitting light in another spectral region (abstract).

Concerning claim 4, Iwasa et al. discloses the optic device including a light transmissive material (abstract).

Regarding claim 5, Iwasa et al. discloses the optic device including at least one of a lens or a light guide having a light transmissive property (abstract).

Concerning claim 6, Iwasa et al. discloses the optic device being further configured to direct the light emitted from the source toward the down conversion material (Fig. 1).

Regarding claim 7, Iwasa et al. discloses the optic device including one of a lens or a light guide for directing substantially all of the light emitted from the source toward the down conversion material (abstract, Fig. 1).

Concerning claim 10, Iwasa et al. discloses the optic device being geometrically configured to transmit the backward transmitted light out of the optic device (Fig. 1).

Regarding claim 11, Iwasa et al. discloses the source of light including a plurality of semiconductor light emitters (abstract).

Concerning claim 12, Iwasa et al. discloses the down conversion material is deposited on a portion of the second end of the optic device (paragraph 0091). (The

conversion material is applied all the way down the tube; nothing in the claim says that it is only on one end.)

Regarding claim 13, Iwasa et al. discloses the down conversion material being deposited to cover substantially the second end of the optic device (paragraph 0091). (The conversion material is applied all the way down the tube; nothing in the claim says that it is only on one end.)

Concerning claim 28, Iwasa et al. discloses a source of light for emitting light (abstract); a down conversion material receiving the emitted light and converting the emitted light into transmitted light and backward transmitted light (abstract); and an optic device, having at least one transparent side wall (Fig. 1), configured to receive the backward transmitted light and transfer substantially all of the backward transmitted light outside of the optic device through the at least one transparent side wall (Fig. 1).

Regarding claim 29, Iwasa et al. discloses at least approximately 84% of the combined transmitted light and backward transmitted light is transferred outside of the optic device (Fig. 1). (Light is being emitted in all directions outside of the transparent tube.)

Concerning claim 30, Iwasa et al. discloses a source of light for emitting light (abstract); a down conversion material receiving the emitted light and converting the emitted light into transmitted light and backward transmitted light (abstract); and an optic device, having at least one transparent side wall (Fig. 1), configured to receive the backward transmitted light and transfer the backward transmitted light outside of the

optic device between the source of light and the down conversion material through the at least one transparent side wall (Fig. 1).

Regarding claim 39, Iwasa et al. discloses the optic device being configured to transfer at least a portion of the backward transmitted light outside of the optic device through the at least one transparent side wall without the at least a portion of the backward transmitted light being reflected off the at least one transparent side wall (Fig. 1).

5. Claims 20, 22, 25, 33, 35, 36, 38 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Tymianski (U.S. Patent 6,385,855).

Regarding claim 20, Tymianski discloses a light transmissive cylindrical optic comprising at least two separate segments (Fig. 1, see core and cladding); at least one light radiation source disposed adjacent an end of the cylindrical optic (Fig. 1); and a down conversion material, disposed along a central longitudinal axis within the cylindrical optic (Fig. 1, see core), for at least one of transmitting or reflecting light transmitted by the light radiation source (Fig. 1).

Concerning claim 22, Tymianski discloses the light radiation source is disposed adjacent one lateral end of the cylindrical optic (Fig. 1).

Regarding claim 24, Tymianski discloses the down conversion material including other material for absorbing light in one spectral region and emitting light in another spectral region (Fig. 1--see fluorescent core).

Regarding claim 25, Tymianski discloses the down conversion material being disposed substantially parallel to a longitudinal axis of the cylindrical optic (Figs. 1 and 2).

Concerning claim 33, Tymianski discloses the at least two separate segments are each substantially similar to each other (Figs. 1-3). (The core and the cladding are both tubes; the claim says "substantially similar" not that the parts are the same.

Regarding claim 35, Tymianski discloses the down conversion material having at least a first side for transmitting light and reflecting light (Fig. 1).

Concerning claim 36, Tymianski discloses the down conversion material having at least a second side for transmitting light and reflecting light (Fig. 1).

Regarding claim 38, Tymianski discloses the cylindrical optic receiving the light reflected by the down conversion material and transfers the reflected light outside of the cylindrical optic (Fig. 1).

Concerning claim 41, Tymianski discloses each segment of the at least two separate segments of the cylindrical optic is comprised of a solid material (column 3, lines 20-35).

6. Claims 31 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Thomas (U.S. Patent 5,097,175).

Regarding claim 31, Thomas discloses a source of light for emitting light (abstract); a down conversion material receiving the emitted light and converting the emitted light into transmitted light and backward transmitted light (abstract); and an optic

device configured to receive the backward transmitted light, transfer the backward transmitted light outside of the optic device (Fig. 2), and avoid substantially all of the backward transmitted light from undergoing multiple reflections within the optic device (column 1, line 60, to column 2, line 45).

Concerning claim 32, Thomas discloses wherein the optic device is configured to avoid transferring substantially all of the backward transmitted light into the down conversion material (column 1, line 60, to column 2, line 45).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasa et al. in view of Tarsa (U.S. Patent 6,350,041).

Regarding claim 14, Iwasa does not disclose a collecting device. Tarsa discloses a collecting device for collecting backward transmitted light which has been transferred out of the optic device (18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Tarsa in the apparatus of Iwasa et al. to direct the light in the desired direction.

Concerning claim 15, Iwasa does not disclose a collecting device. Tarsa discloses wherein the collecting device includes a reflector for directing the backward transmitted light that has been transferred out of the optic device away from the collecting device (18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Tarsa in the apparatus of Iwasa et al. to direct the light in the desired direction.

Regarding claim 16, Iwasa et al. discloses (a) the source of light is disposed adjacent a first end of the optic device (Fig. 1), (b) the down conversion material is disposed adjacent a second end of the optic device (paragraph 0091). (The conversion material is applied all the way down the tube; nothing in the claim says that it is only on one end.) Iwasa et al. does not disclose a reflector.

Tarsa discloses the first end of the optic device is disposed adjacent a first end of the reflector (Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Tarsa in the apparatus of Iwasa et al. to direct the light in the desired direction.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasa et al. in view of Broer (U.S. Patent 6,210,012).

Regarding claim 17, Iwasa does not disclose an optical device of the shape required in the claim. Broer discloses the geometrical shape of the optic device including a box-shaped apparatus (4, Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Broer in the apparatus of Iwasa et al. to direct light as desired.

10. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasa et al. in view of Tarsa and Kano et al. (U.S. Patent 3,875,456).

Regarding claim 18, Iwasa et al. does not disclose a reflector or diffuser. Tarsa discloses a reflector (Fig. 1) surrounding at least a portion of the optic device (Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Tarsa in the apparatus of Iwasa et al. to direct the light in the desired direction.

Iwasa et al. and Tarsa do not disclose a diffuser. Kano discloses a light diffuser (abstract) deposited on top of at least a portion of the reflector (Fig. 2, abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Kano in the apparatus of Iwasa et al. and Tarsa to collect and diffuse the light as desired.

Concerning claim 19, Iwasa et al. discloses the down conversion material having a curved shape (Fig. 3a). Iwasa does not disclose the down conversion material being between the light source and the reflector. Tarsa discloses the down conversion material being disposed between the source of light and the reflector (Fig. 6a). (The down conversion material is between the source of light and the reflector in terms of following the path of the light.)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Tarsa in the apparatus of Iwasa et al. to direct the light in the desired direction.

11. Claims 21, 23, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tymianski in view of Iwasa et al.

Regarding claim 21, Tymianski does not disclose an LED. Iwasa et al. discloses an LED (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Iwasa et al. in the apparatus of Tymianski to lengthen the service life of the apparatus.

Concerning claim 23, Tymianski does not disclose first and second radiation sources. Iwasa et al. discloses first and second radiation sources, spaced from each other and both disposed adjacent one lateral end of the cylindrical optic (Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Iwasa et al. in the apparatus of Tymianski to produce more light than with one light source.

Regarding claim 26, Tymianski and Iwasa do not disclose at least one light source on each side of the down conversion material. Putting at least one light source on each side of the down conversion material is considered to be an obvious variation. Since the light source and the down conversion material are well known in the art, it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the light sources to produce light in the desired directions, since rearranging parts requires only routine skill in the art. See MPEP 2144.04.

Concerning claim 27, Tymianski does not disclose light sources mounted on a substrate. Iwasa et al. discloses the light sources mounted on at least one substrate (Figs. 2A and 2B).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration of Iwasa et al. in the apparatus of Tymianski to secure the light sources in place and easily conduct electricity to them.

12. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tymianski.

Regarding claim 34, Tymianski does not specifically disclose the down conversion material being planar shaped. Shaping the down conversion material into a plane would be an obvious variation. Since the down conversion material is well known

in the art, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the down conversion material planar to conform to a particular shape of cladding material, since changing the shape of an element involves only routine skill in the art. See MPEP 2144.04.

Allowable Subject Matter

13. Claim 37 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter. The prior art fails to disclose a light source having a first segment of the at least two separate segments of the cylindrical optic has a first surface, a second segment of the at least two separate segments of the cylindrical optic has a second surface, and the down conversion material is disposed between the first surface and the second surface as recited in claim 37.

Response to Arguments

15. The Examiner again apologizes for the inconvenience of this Office Action. References were found during routine procedures after the phone conversations memorialized in the Interview Summaries. Please note the allowable subject matter above. Thus, the arguments presented in the most recent amendment are rendered moot due to new grounds of rejection.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHARON E. PAYNE whose telephone number is (571)272-2379. The examiner can normally be reached on regular business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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